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## Urogenital Deformities in two Species of Snakes

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Recently two snakes have come to my attention which show interesting urogenital deformities. The first, an *Elaphe vulpina vulpina* Baird and Girard (NU 2762), was noted while preserving the specimen at Northwestern University; the second, a *Crotalus viridis viridis* Rafinesque (CA 14497), was called to my attention by Dr. Howard K. Gloyd. Both snakes were found to have only one penis that could be evaginated. In order to determine the cause of this the urogenital systems of both snakes were dissected.

In the fox snake the cloaca is normal. The openings of the bursae of the ureters are located dorsally and slightly posterior to the center of the chamber. The sulcus spermaticus of the right penis begins normally as a deep groove, becoming progressively more shallow till, at about one-third of the way to the tip of the penis, it is covered by folds of the penis integument. The left sulcus begins normally at the opening of the bursa, but comes to an abrupt end at a point on the cloacal wall corresponding closely to the area where the right sulcus continued up the penis. Dr. Gloyd has pointed out an area of differentiated tissue at the end of the left sulcus which may be scar tissue. It should be noted that the left penis retractor muscles (the sphincter caudae and sphincter anae) are somewhat smaller than the right (Fig. 1, B).

Other than the missing penis the fox snake seems normal in every respect. The remainder of the urogenital system corresponds quite closely to the description of this species in Kellicott (1898, p. 59-63). Scalation of the specimen is normal. After its capture in June, 1946, at Champaign, Champaign County, Illinois by Stanley Auerbach it was caged in the ecology laboratory at Northwestern University, where it certainly was not injured by students nor by other snakes caged with it. While in captivity the snake ate three white rats on October 4th, and 14th, and November 8, 1946. It died January 21st, 1947. During this period none of the observed behavior of this snake indicated the abnormality.

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The rattlesnake is in essentially the same condition as the fox snake, except that the right penis is missing. Again the penis retractor muscle is smaller on the affected side than on the normal side. On either side the sulci begin at the openings of the bursae of the ureters, the right ending in the tissue of the cloacal wall at a point where the left continues up the penis. The remainder of the urogenital system is normal (Fig. 1, A). It is interesting to note, however, that this specimen has an abnormal anal plate, the right half of which is considerably shorter than the left. The rattle gives the appearance of once having been injured. Only one abnormal segment (the basal) is present, additional segments seem not to have been added since the injury. The tail/total-length ratio for the specimen is .0738, which seems normal when compared with the .0745 mean noted by Klauber (1943, table 19) for Pierre, S. D. males. Prior to its capture the snake had crossed a tar road, and some of the tar had stained its ventrals. This band of stain extends from the anterior to the posterior end of the snake; it is not centered on the belly, but shifted to the right of the midline, indicating that in crawling the entire body was inclined toward the injured side. Whether this was caused by the injury or not cannot be stated. This snake was collected at Thatcher (8 miles east of Parade), Dewey County, South Dakota, September 6, 1947, by a field party from the Chicago Academy of Sciences.

Two possible explanations present themselves for these two deformities: first that they are due to developmental failure; second, that they are the results of accidents. The fact that the rest of the urogenital systems are normal would seem to throw doubt on the first. The fact that the anal plate and the rattle of the *Crotalus* are deformed would seem to indicate injury. It seems difficult to understand how these penes could have been lost without greater injury to surrounding tissue. To the best of my knowledge the penes of snakes are evaginated only during copulation and times of great duress.\* That the penis of the *Elaphe* could have been removed without any other damage being done seems incredible. The general appearance of the *Crotalus* seems to indicate an injury to the snake while it was young, that is, the lost penis, the lopsided anal plate, and the malformed rattle being the only remaining evidence of the injury.

I am indebted to Dr. Howard K. Gloyd and Dr. Orlando Park for permission to study the specimens and to Miss Marie Wilson of the Department of Zoology, Northwestern University, for preparing the figures.

\*I refer, of course, to the superstition prevalent among some of the southern negroes that snakes will "put out their feet" when thrown into a fire.

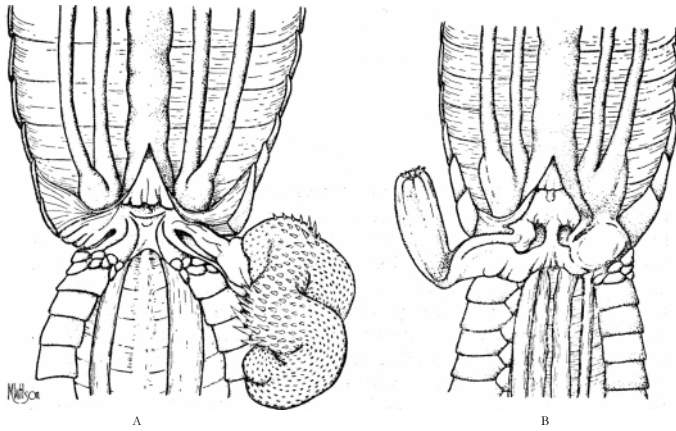


Figure 1. Urogenital abnormalities in (A) *Crotalus viridis viridis* and (B) *Elaphe vulpina vulpina*.

#### LITERATURE CITED

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1898 The dissection of the ophidian. General Biol. Supply House, Chicago, 1939, facsimile, p. 1-72, fig. 1-12.
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*Natural History Miscellanea*, a series of miscellaneous papers initiated in 1946 as an outlet for original articles, more or less technical in nature, one to four pages in length, in any field of natural history. Individual issues, published at irregular intervals, are numbered separately and represent only one field of specialization; e. g., botany, geology, entomology, herpetology, etc. The series is distributed to libraries and scientific organizations with which the Academy maintains exchanges. A title page and index will be supplied to these institutions when a sufficient number of pages to form a volume have been printed. Individual specialists with whom the museum or the various authors maintain exchanges receive those numbers dealing with their particular fields of interest. A reserve is set aside for future exchanges and a supply of each number is available for sale at a nominal price. Authors may obtain copies for their personal exchanges at the prevailing rates for similar reprints.

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